Small Business Innovation Research/Small Business Tech Transfer

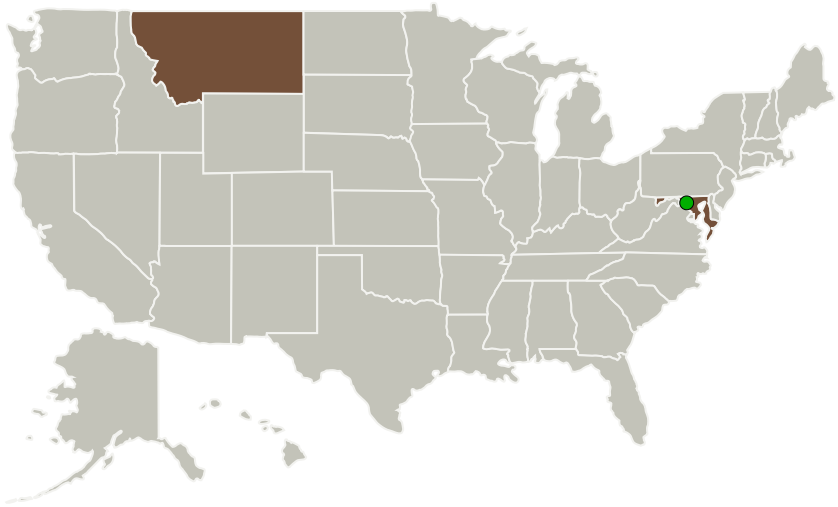
Seed-Derived Second Harmonic Source for In-Situ Alignment and Calibration of Trace Gas Measurement Instruments, Phase I

Completed Technology Project (2014 - 2014)

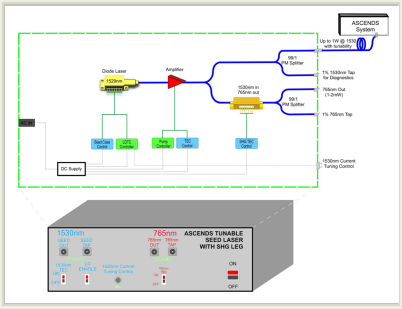
Project Introduction

This SBIR Phase I effort will demonstrate the feasibility of developing a tunable, high-power, narrowband seed laser source integrated with a broadband, waveguide-based second harmonic generation (SHG) module to allow in situ alignment, component testing and calibration across the tuning range of fiber-based lidar systems for measuring atmospheric oxygen concentrations. The lidar is being developed as part of a dual-wavelength remote sensing system for high precision CO2 measurements. Active laser-based spectroscopic remote sensing can map changes in CO2 concentration over the entire globe. However, the measurement of CO2 concentration varies depending on properties such as humidity, temperature, and pressure. To remove these variables, measurement of a stable, well-mixed gas such as oxygen is required as well. Generation of a broadly tunable SHG source with integrated laser for downstream seeding will further this approach.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
ADVR, Inc.	Lead Organization	Industry	Bozeman, Montana
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland



Seed-Derived Second Harmonic source for in situ alignment and calibration of trace gas measurement instruments Project Image

Table of Contents

Seed-Derived Second Harmonic Source for In-Situ Alignment and Calibration of Trace Gas Measurement Instruments, Phase I

Completed Technology Project (2014 - 2014)

Primary U.S. Work Locations	
Maryland	Montana

Project Transitions

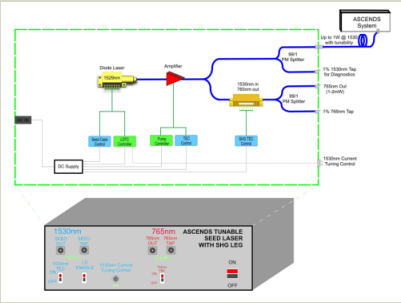
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138487)*

Images



Project Image
Seed-Derived Second Harmonic source for in situ alignment and calibration of trace gas measurement instruments Project Image
(https://techport.nasa.gov/image/126133)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ADVR, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Justin T Hawthorne

Co-Investigator:

Justin Hawthorne

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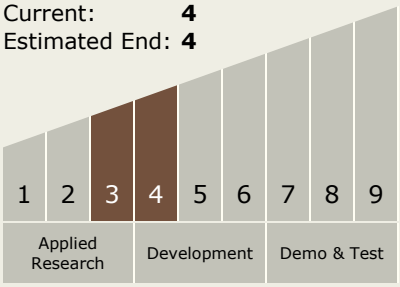
Completed Technology Project (2014 - 2014)

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.4 Environment Sensors

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System